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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/284,222	07/22/1999	HISASHI TSUJIMOTO	P990708	2037

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EXAMINER
DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
1745	25

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/284,222	Tsujimoto
Examiner	**Art Unit**
Tracy D ve	1745

-- *The MAILING DATE of this communication appears on th cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Oct 4, 2002*.

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *7-9 and 12-16* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *7-9 and 12-16* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the communication filed on 10/4/02. Applicant's arguments have been considered, but are not convincing. Claims 7-9 and 12-16 are rejected in view of the prior art of record. Claims 1-6, 10 and 11 are canceled. This Action is **Final**, as necessitated by amendment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7-9 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki, US 5,731,098 in view of Koichiro, JP 9-213337.

Suzuki teaches a non-aqueous secondary battery having an electrode formed by coating a depolarizing mix of electrode active materials on a current collector. The depolarizing mix for positive and negative electrodes may comprise a conductivity-imparting agent, a binder, a dispersant, a filler, an ionic conductivity-imparting agent, a pressure increasing agent and various types of addition agents. Active materials for the positive electrode include lithium-containing transition metal oxides such as lithium cobalt oxide. Active materials for the negative electrode

include graphite and coke. See col. 5, lines 26-56. The binder for the positive and negative electrodes may be carboxymethyl cellulose (CMC), polytetrafluoroethylene (PTFE), polyvinylidene fluoride (PVDF) and styrene-butadiene rubber (SBR). Of these materials CMC, PTFE and PVDF are particularly preferred. The separator may be any insulating thin film having a high ion-permeability and desired mechanical strength. See col. 6, lines 27-47. The negative active material layer is applied to both sides of a copper foil and the positive active material layer is applied to both sides of an aluminum foil. See col. 8, lines 26-50. The positive electrode, separator and negative electrodes are laminated and wound to give an electrode assembly. The wound assembly is accommodated in a cylindrical cell. Suzuki teaches that CMC was added to the depolarizing mix in an amount of 1 wt%. The binder is 5 pts by weight of the negative electrode and 4 pts by weight of the positive electrode. See col. 8, lines 56-61.

Suzuki does not explicitly teach that the binder includes both a fluorine polymer and an aromatic vinyl-conjugate diene polymer.

However, Koichiro teaches a binder for a battery, a binder composition and an electrode including the binder. The battery of Koichiro provides stable performance by increasing an initial capacity, reducing a capacity decrease and decreasing chipping and cracking of an electrode surface pasted with an active material. The binder composition has a polyvinylidene fluoride system polymer (for instance, polyvinylidene fluoride) and a rubber polymer dispersed in an organic solvent. The binder composition and active material are mixed to form a slurry and the slurry is applied to a current collector. The solvent is dried to form the electrode of the

battery. See abstract. The negative electrode active material is carbon and the positive electrode active material is $LiCoO_2$. See abstract. Koichiro teaches that the polyvinylidene fluoride is at least 50% or greater of the binder material (see page 2, 2nd col., after [0009]) and the rubber polymer is 50% or less of the binder material (page 3, lst col., after [0010]).

A partial Japanese translation of the reference is attached. Koichiro has a specific teachings that the negative electrode contains 8 wt% of binder in addition to the carbon active material. The negative electrode active material slurry was prepared and applied on a copper foil. The layer was dried and roll pressed to form the negative electrode. See Examples, paragraph [0036]. Moreover, the binder is contained in the positive electrode in an amount of 4 wt%. The positive electrode active material slurry was prepared and applied to an aluminum foil. The layer was dried and roll pressed to form the positive electrode. See Examples, paragraph [0037]. A nonaqueous cell comprising the positive and negative electrodes was then assembled (see paragraph [0039]). Koichiro teaches the rubber polymer is an aromatic vinyl and conjugated-diene system polymer which is formed by emulsion polymerization as a latex particle (see paragraph [0015]). The abstract teaches the rubber polymer may contain styrene and butadiene (also see paragraph [0014]). Koichiro teaches and suggests a cylindrical battery in paragraph [0039]. This paragraph also teaches a separator between two electrodes of a circular polypropylene layer.

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would be motivated to use the

binder of Koichiro as the binder material for the electrodes of Suzuki. Suzuki teaches that CMC, PTFE, PVDF and styrene-butadiene rubber (aromatic vinyl-conjugate diene polymer) are all known binder materials. The courts have ruled, it is prima facie obvious to combine two compositions, each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose, *In re Kerkhoven*, 205 USPQ 1069, 1072. Furthermore, Koichiro teaches a binder including both a fluorine polymer and aromatic vinyl-conjugate diene polymer decreases chipping and cracking of an electrode surface pasted with an active material. Thus, one of skill would be motivated to use the binder of Koichiro in the electrode of Suzuki in order to reduce chipping and cracking of the electrode surface pasted with the active material.

Claims 7-9, 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koichiro, JP 9-213337, as evidenced by Yamashita.

Koichiro teaches a binder for a battery, a binder composition and an electrode including the binder. The battery of Koichiro provides stable performance by increasing an initial capacity, reducing a capacity decrease and decreasing chipping and cracking of an electrode surface pasted with an active material. The binder composition has a polyvinylidene fluoride system polymer (for instance, polyvinylidene fluoride) and a rubber polymer dispersed in an organic solvent. The binder composition and active material are mixed to form a slurry and the slurry is applied to a current collector. The solvent is dried to form the electrode of the battery. See abstract. The

negative electrode active material is carbon and the positive electrode active material is $LiCoO_2$. See abstract. Koichiro teaches that the polyvinylidene fluoride is at least 50% or greater of the binder material (see page 2, 2nd col., after [0009]) and the rubber polymer is 50% or less of the binder material (page 3, lst col., after [0010]).

A partial Japanese translation of the reference is attached. Koichiro has a specific teachings that the negative electrode contains 8 wt% of binder in addition to the carbon active material. The negative electrode active material slurry was prepared and applied on a copper foil. The layer was dried and roll pressed to form the negative electrode. See Examples, paragraph [0036]. Moreover, the binder is contained in the positive electrode in an amount of 4 wt%. The positive electrode active material slurry was prepared and applied to an aluminum foil. The layer was dried and roll pressed to form the positive electrode. See Examples, paragraph [0037]. A nonaqueous cell comprising the positive and negative electrodes was then assembled (see paragraph [0039]). Koichiro teaches the rubber polymer is an aromatic vinyl and conjugated-diene system polymer which is formed by emulsion polymerization as a latex particle (see paragraph [0015]). The abstract teaches the rubber polymer may contain styrene and butadiene (also see paragraph [0014]). Koichiro teaches and suggests a cylindrical battery in paragraph [0039]. This paragraph also teaches a separator between two electrodes of a circular polypropylene layer.

Koichiro does not explicitly teach the positive and negative active material layers are applied to both sides of positive and negative current collector, respectively. Koichiro teaches

that active material layer is applied to the current collector, but is silent as to wether the active material layer is applied to both or only one side of the collector.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have known that the active material layer could have been applied to both sides of a current collector. It is conventional to apply the active material to both sides of a current collector. This is evidenced by Yamashita. The Figures of Yamashita clearly show that active material is applied to both sides of a current collector.

Koichiro does not explicitly teach the inventive binder further includes a cellulose derivative and does not specifically teach the type of carbon material in the negative electrode.

However, Koichiro does teach and suggest adding carboxyl methyl cellulose as a thickener (viscosity agent) to a binder composition including a styrene-butadiene latex is known in the art. See paragraph [0005] under "Prior Art".

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include CMC in a binder composition containing polyvinylidene fluoride and styrene-butadiene latex because Koichiro teaches that these compounds are known to be used together in a binder composition for a negative electrode. Koichiro teaches that CMC is a known thickening agent for negative electrodes containing a carbon active material and a polyvinylidene fluoride binder.

Regarding claims 14 and 15, one of skill would know that graphite or non-graphitizing carbon is a carbon material and is commonly used as the negative electrode active material for nonaqueous batteries. Linden, Handbook of Batteries, pg. 36.4, Table 36.2 teaches the various well known carbon materials for a negative electrode. See also Table 36.3 on page 36.6. Both graphite and coke are shown by Linden to be typical or common negative electrode materials.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koichiro, JP 9-213337 in view of Abe et al., JP 8-195201.

See discussion of Koichiro above.

Koichiro does not explicitly teach the amount of the cellulose derivative added to the negative electrode.

However, Abe teaches a nonaqueous battery negative electrode mix which is high in viscosity. Abe teaches that it is known to mix water and carboxymethyl cellulose (CMC) together, then add polyvinylidene fluoride, acetylene black and graphite to obtain the negative electrode mix. Abe teaches that aggregates such as binder aggregate and carbon aggregate in the negative electrode mix can be reduced without the viscosity of the negative electrode mix being lowered. Abe teaches the CMC was added in an amount of 0.5-5 wt% as a thickener to the binder composition (see paragraphs [0008] and [0010]). A partial Japanese translation of Abe et al. is attached.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include 0.1-5 wt % of CMC in a binder composition containing polyvinylidene fluoride and styrene-butadiene latex because Abe and Koichiro both teach that these compounds are known to be used together in a binder composition for a negative electrode. One of skill would be motivated to combine Abe and Koichiro because they teach negative electrodes for nonaqueous batteries containing carbon, polyvinylidene fluoride and CMC. Abe is applied to show a prior art teaching of an amount of CMC added to the negative electrode mix. Both Abe and Koichiro teach that CMC is added to the negative electrode mix as a thickening agent.

Response to Arguments

Applicant's arguments filed 10/4/02 have been fully considered but they are not persuasive.

All rejections under 35 U.S.C. 112, second paragraph, have been withdrawn.

The 35 U.S.C. 102 rejection of claims 7-9 and 16 as anticipated by Koichiro has been withdrawn. Note these claims are rejected as being obvious in view of Koichiro.

Applicant merely states that it has been "uniquely discovered that the specific material makeup in combination with the structural features of the claimed invention can provide a nonaqueous secondary battery which is capable of preventing an excessive rise in the temperature even if an unexpected external short circuit occurs during use". However, no support or evidence

is provided that supports such a broad statement. Specifically, the only difference between the previous independent claim 7 and the newly amended claim 7 is that the claim requires a cylindrical battery having active material pasted on both sides of the current collector for both the positive and negative electrodes. A separator is interposed between the positive and negative electrode. Applicant has not shown that this specific structural feature provides any "uniquely discovered" property. Furthermore, Koichiro teaches and suggests cylindrical batteries (see discussion above).

It appears Applicant is attempting to show "unexpected results". However, evidence of unexpected results must be between the instant claims and the prior art of record. Applicant has not distinguished the instant claims over Koichiro.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR

1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

December 6, 2002

CAROL CHANEY
PRIMARY EXAMINER